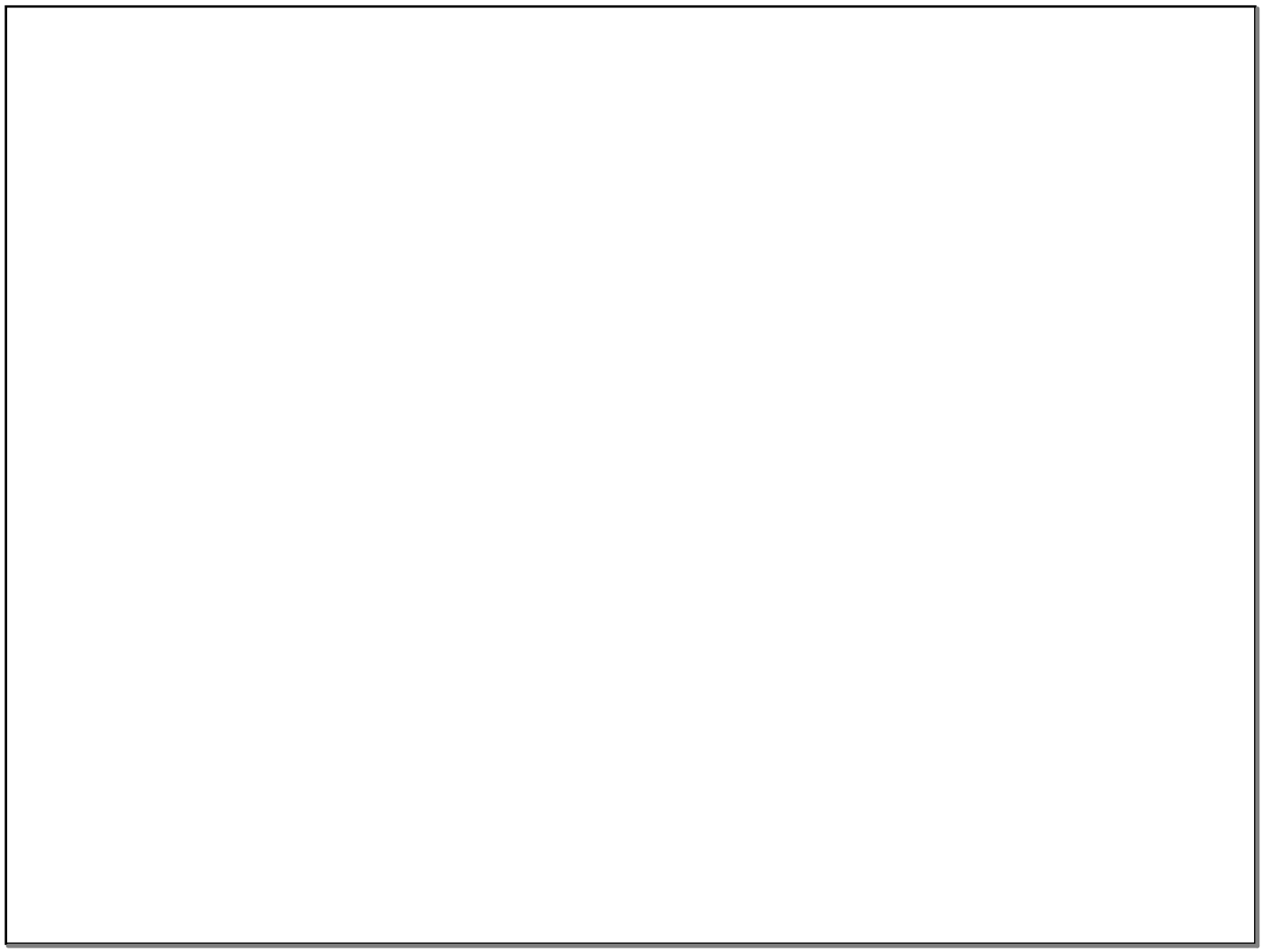


Chapter 4 Functions

4.4b Activity Comparing Rates

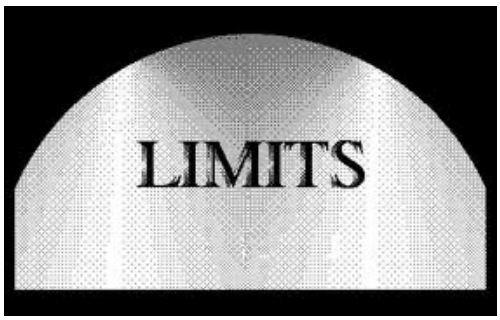
Unit Question:

How do we function within the limits we have?

Chapter 4 Functions

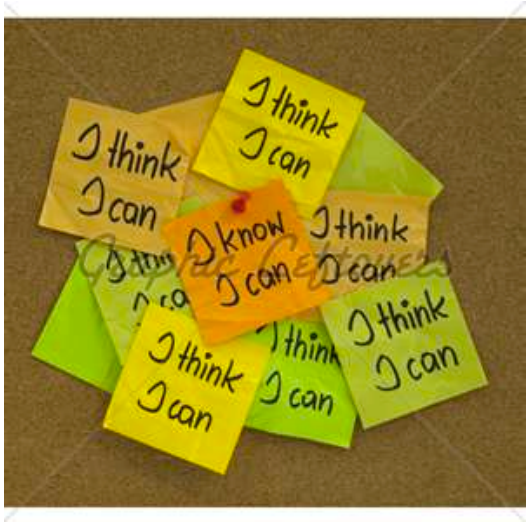
Learner Profile: Communicator

Area of Interaction: Environments



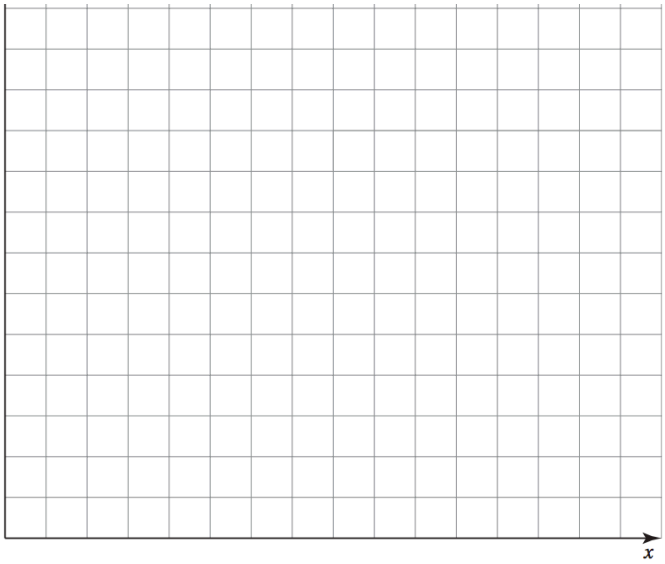
I Can Statement:

I can compare proportional relationships and functions.



You want to go bowling or miniature golfing. Let $y = 3x$ represent the amount of money per game you spend bowling. Let $y = 5x$ represent the amount of money per game you spend miniature golfing.

Graph each equation on the same coordinate plane. What does the slope of each equation represent? Which activity costs more per game?

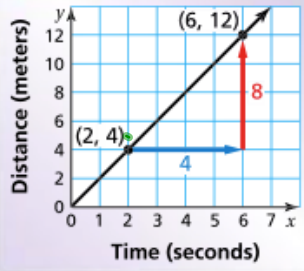


Use the table to find the rate.

1.

Hours	1	2	3	4
Miles	55	110	165	220

Two-Person Lift



The distance y (in meters) traveled by a four-person ski lift in x seconds is represented by the equation $y = 2.5x$. The graph shows the distance traveled by a two-person ski lift.

a. Which ski lift is faster?

Four-Person Lift ***Two-Person Lift***

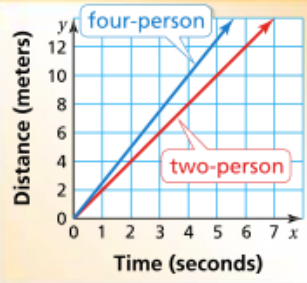
The equation is written in slope-intercept form.

2.5 2

b. Graph the equation that represents the four-person lift in the same coordinate plane as the two-person lift. Compare the steepness of the graphs. What does this mean in the context of the problem?

b. Graph the equation that represents the four-person lift in the same coordinate plane as the two-person lift. Compare the steepness of the graphs. What does this mean in the context of the problem?

Ski Lift



The earnings y (in dollars) of a nighttime employee working x hours is represented by the function $y = 7.5x + 30$. The table shows the earnings of a daytime employee.

Time (hours)	1	2	3	4
Earnings (dollars)	12.50	25.00	37.50	50.00

+1 +1 +1

+12.50 +12.50 +12.50

a. Which employee has a higher hourly wage?

Nighttime Employee *Daytime Employee*

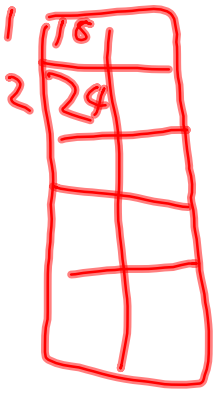
7.50 12.50

b. Write a function that relates the daytime employee's earnings to the number of hours worked. Graph the functions that represent the earnings of the two employees in the same coordinate plane. Interpret the graphs.

Solve with your table

Your earnings y (in dollars) after raking leaves for x hours is represented by the function $y = 6x + 12$. The table shows the earnings of your friend.

Time (hours)	1	2	3	4
Earnings ($)	9	18	27	36

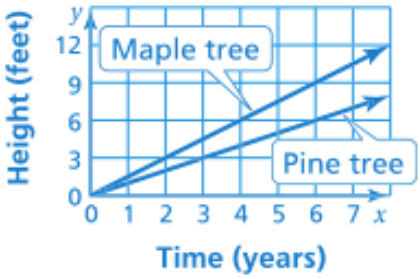


a. Who has a higher hourly wage?

b. Write a function that relates your friend's earnings to the number of hours worked. Graph both functions. Interpret the graphs.

2. Write and graph equations that represent the growth rates of each tree. Compare the steepness of the graphs. What does this mean in the context of the problem?

Maple tree: $y = 1.5x$; Pine tree: $y = x$



The graph that represents the maple tree is steeper than the graph that represents the pine tree. So, the maple tree grows faster than the pine tree.

Practice

1. **BIOLOGY** Toenails grow about 13 millimeters per year. The table shows fingernail growth.

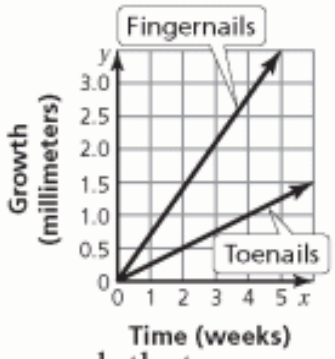
Weeks	1	2	3	4
Fingernail Growth (millimeters)	0.7	1.4	2.1	2.8

   a. Do fingernails or toenails grow faster?

   b. Graph equations that represent the growth rates of toenails and fingernails in the same coordinate plane. Compare the steepness of the graphs. What does this mean in the context of the problem?

1. a. fingernails

   b.



The graph that represents fingernails is steeper than the graph that represents toenails. So, fingernails grow faster than toenails.

Practice

2. **EMPLOYMENT** Manager A earns \$15 per hour and receives a \$50 bonus. The graph shows the earnings of Manager B.

   a. Which manager has a higher hourly wage?

   b. After how many hours does Manager B earn more money than Manager A?

2. a. Manager B

b. after 5 hours

2. a. Manager A

\$15 per hour

Manager A earns \$15 per hour.

Manager B

$$\frac{\text{change in earnings}}{\text{change in time}} = \frac{\$75}{3 \text{ hours}} = \frac{\$25}{1 \text{ hour}}$$

Manager B earns \$25 per hour.

So, Manager B has a higher hourly wage.

b. Manager A

$$\boxed{\text{Earnings}} = \boxed{\begin{matrix}\text{Hourly}\\ \text{wage}\end{matrix}} \cdot \boxed{\begin{matrix}\text{Hours}\\ \text{worked}\end{matrix}} + \boxed{\text{Bonus}}$$

$$y = 15x + 50$$

Because the graphs intersect at the point $(5, 125)$, Manager B will earn more money than Manager A after 5 hours.

Solve on Your Own.

Mini-Assessment

A maple tree grows 1.5 feet each year. The table shows the yearly growth for a pine tree.

Time (yr)	1	2	3	4
Growth (in.)	12	24	36	48

1. Which tree grows faster?

Homework Due Monday

Workbook p92A & B

b. **Write a function that relates the daytime employee's earnings to the number of hours worked. Graph the functions that represent the earnings of the two employees in the same coordinate plane. Interpret the graphs.**